Exhibit L

IN THE U.S. PATENT AND TRADEMARK OFFICE

Appl. No.	:	11/239,706	
Applicant	:	Benoist Sebire, et al.	
Filed	:	September 29, 2005	
TC/AU	:	2416	(confirmation no. 4364)
Examiner	:	Jason E. Mattis	
Docket No.	:	859.0052.U1(US)	
Customer No.	:	29683	
Title	:	SLOW MAC-E FOR AUTONOMOUS TRANSMISSION IN HIGH-SPEED UPLINK PACKET ACCESS (HSUPA) ALONG WITH SERVICE SPECIFIC TRANSMISSION TIME CONTROL	

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REQUEST FOR CONTINUING EXAMINATION

Sir:

This paper is in reply to the Final Office Action dated July 27, 2009, and requests continuing examination of the above referenced US Patent Application under 37 C.F.R. § 1.114 and M.P.E.P. § 706.07(h). The Patent Office is authorized to debit deposit account number 50-1924 in the amount of $810 for the RCE fee, and for any additional fee that may be required to maintain the pendency of this application and/or to advance this request for continuing examination. This paper is in 12 pages. Please amend the application as follows:

Amendments to the Specification: None.

Amendments to the Claims begins at page 2 of this paper.

Amendments to the Drawings: None.

Remarks/Arguments begin on page 8 of this paper.

Appendix: None.

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in this application.

1-45. (Canceled)

46.(Currently Amended) A method comprising:

determining a virtual transmission time interval for a medium access control entity of an apparatus;

checking to determine whether the medium access control entity is transmitting data packets from the apparatus in a current air interface transmission time interval; and

for the case where it is determined that the medium access control entity is not transmitting from the apparatus in the current air interface transmission time interval, transmitting a next data packet from the apparatus after a predetermined period associated with ~~period determined by~~ the virtual transmission time interval has elapsed.

47.(Previously Presented) The method of claim 46, wherein the virtual transmission time interval comprises a minimum time interval that is allowed between uplink transmissions.

48.(Previously Presented) The method of claim 46, wherein the next data packet comprises at least one protocol data unit and the virtual transmission time interval is an integer multiple of the current air interface transmission time interval.

49.(Previously Presented) The method of claim 46, wherein checking to determine whether the medium access control entity is transmitting data packets in a current air interface transmission time interval comprises checking to determine if the medium access control entity emptied its radio link control buffer.

50.(Previously Presented) The method of claim 49, wherein transmitting comprises transmitting at least one protocol data unit from the buffer.

51.(Previously Presented) The method of claim 50, wherein transmitting the at least one protocol data unit comprises selecting a transport format combination as a function of the virtual transmission time interval.

52.(Previously Presented) The method of claim 51, wherein selecting the transport format combination is a function of occupancy of the radio link control buffer and the virtual transmission time interval.

53.(Previously Presented) The method of claim 50, wherein transmitting the at least one protocol data unit comprises transmitting it over a dedicated channel.

54.(Previously Presented) The method of claim 46, wherein determining the virtual transmission time interval comprises receiving from a network element the virtual transmission time interval.

55.(Previously Presented) The method of claim 46, wherein determining the virtual transmission time interval is without explicit network signaling.

56.(Previously Presented) The method of claim 46, executed by a mobile station for autonomous uplink transmission in which a scheduling grant from a network is not required.

57.(Currently Amended) A memory embodying a computer program executable by a processor for performing actions directed toward changing a transmission interval, said actions comprising:

determining a virtual transmission time interval for a medium access control entity;

checking to determine whether the medium access control entity is transmitting data packets in a current air interface transmission time interval; and

for the case where it is determined that the medium access control entity is not transmitting in the current air interface transmission time interval, transmitting a next data packet after a predetermined period associated with ~~period determined by~~ the virtual transmission time interval has elapsed.

58.(Previously Presented) The memory of claim 57, wherein the virtual transmission time interval comprises a minimum time interval that is allowed between uplink transmissions.

59.(Previously Presented) The memory of claim 57, wherein the next data packet comprises at least one protocol data unit and the virtual transmission time interval is an integer multiple of the current air interface transmission time interval.

60.(Previously Presented) The memory of claim 57, wherein checking to determine whether the medium access control entity is transmitting data packets in a current air interface transmission time interval comprises checking to determine if the medium access control entity emptied its radio link control buffer.

61.(Previously Presented) The memory of claim 60, wherein transmitting comprises transmitting at least one protocol data unit from the buffer.

62.(Previously Presented) The memory of claim 61, wherein transmitting the at least one protocol data unit comprises selecting a transport format combination as a function of the virtual transmission time interval.

63.(Previously Presented) The memory of claim 62, wherein selecting the transport format combination is a function of occupancy of the radio link control buffer and the virtual transmission time interval.

64.(Previously Presented) The memory of claim 61, wherein transmitting the at least one protocol data unit comprises transmitting it over a dedicated channel.

65.(Previously Presented) The memory of claim 57, wherein determining the virtual transmission time interval comprises receiving from a network element the virtual transmission time interval.

66.(Previously Presented) The memory of claim 57, wherein determining the virtual transmission time interval is without explicit network signaling.

67.(Previously Presented) The memory of claim 57, wherein the computer readable medium and the processor are disposed in a mobile station, and the actions are for autonomous uplink transmission in which a scheduling grant from a network is not required.

68.(Currently Amended) An apparatus comprising:

a memory adapted to store computer program instructions and a virtual transmission time interval;

a wireless transceiver;

a processor adapted to:

check to determine whether the apparatus is transmitting data packets in a current air interface transmission time interval; and

for the case where it is determined that the apparatus is not transmitting in the current air interface transmission time interval, to cause the transmitter to transmit a next data packet after a predetermined period associated with ~~period determined by~~ the virtual transmission time interval has elapsed.

69.(Previously Presented) The apparatus of claim 68, wherein the virtual transmission time interval comprises a minimum time interval that is allowed between uplink transmissions.

70.(Previously Presented) The apparatus of claim 68, wherein the next data packet comprises at least one protocol data unit and the virtual transmission time interval is an integer multiple of the current air interface transmission time interval.

71.(Previously Presented) The apparatus of claim 68, further comprising a radio link control buffer coupled to the wireless transceiver,
and wherein the check to determine whether the mobile station is transmitting data packets in a current air interface transmission time interval comprises a check to determine if the radio link control buffer is empty.

72.(Previously Presented) The apparatus of claim 71, wherein the next data packet comprises at least one protocol data unit sent from the buffer to the transceiver.

73.(Previously Presented) The apparatus of claim 70, wherein for the case where the processor is adapted to cause the transceiver to transmit the at least one protocol data unit, the processor is further adapted to select a transport format combination for the at least one protocol data unit as a function of the virtual transmission time interval.

74.(Previously Presented) The apparatus of claim 73, wherein the transport format combination is a function of occupancy of the radio link control buffer and the virtual transmission time interval.

75.(Previously Presented) The apparatus of claim 68, wherein the transmitter is adapted to transmit the next data packet over a dedicated channel.

76.(Previously Presented) The apparatus of claim 68, wherein the virtual transmission time interval is received from a network element via the wireless transceiver.

77.(Previously Presented) The apparatus of claim 68, wherein the virtual transmission time interval is determined by the processor without explicit network signaling.

78.(Previously Presented) The apparatus of claim 68, wherein the virtual transmission time interval is used for autonomous uplink transmission in which a scheduling grant from a network is not required.

79.(Currently Amended) An apparatus comprising:

means for determining a virtual transmission time interval for a medium access control entity;

means for checking to determine whether the medium access control entity is transmitting data packets in a current air interface transmission time interval; and

for the case where it is determined that the medium access control entity is not transmitting in the current air interface transmission time interval, means for transmitting a next data packet after a <u>predetermined period associated with</u> ~~period determined by~~ the virtual transmission time interval has elapsed.

80.(Previously Presented) The apparatus of claim 79, wherein:

the means for determining comprises a wireless receiver configured to receive a message from a network entity that includes the virtual transmission time interval;

the means for checking comprises a processor adapted to determine whether a radio link control buffer is empty; and

the means for transmitting comprises a wireless transmitter coupled to the processor and configured to transmit a protocol data unit only after it is determined that the period determined by the virtual transmission time interval has elapsed.

81.(Previously Presented) The apparatus of claim 68, wherein the apparatus comprises a mobile station.

82.(Previously Presented) The apparatus of claim 79, wherein the apparatus comprises a mobile station, and the virtual transmission time interval is an integer multiple of the current air interface transmission time interval.

REMARKS/ARGUMENTS:

The final Office Action dated July 27, 2009 concluded as follows for the subject application:

- Claims 46-48, 53-58, 64-69, 75-79 and 81 are rejected under 35 USC 102(e) as anticipated by Sarkar (US Publ 2004/0190914);
- Claims 48, 59, 70, 73-74 and 82 are rejected under 35 USC 103(a) as obvious over Sarkar in combination with Kim '653 (US 7,215,653); and
- Claims 49-50, 60-61, 71-72 and 80 are rejected under 35 USC 103(a) as obvious over Sarkar in combination with Vrzic (US Publ. 2004/0228349);
- Claims 51-52 and 62-63 are rejected under 35 USC 103(a) as obvious over Sarkar in combination with Vrzic and Kim '653; and
- Claims 73-74 are rejected under 35 USC 103(a) as obvious over Sarkar in combination with Vrzic and Kim '555 (US 7,450,555).

Claims 46, 57, 68 and 79 are independent, each of which is amended with subject matter set forth in the application as published at US Publ. 2006/0120404 at ¶0021 ["In the preferred embodiment, the new parameter is a "virtual TTI" that defines the minimum time interval between subsequent new transmissions for a MAC-d flow."] and also at ¶0059 ["(i) if the MAC is able to empty the RLC buffer during this air interface TTI, then the MAC will check the RLC buffer at the next predetermined subsequent time interval after the virtual TTI"]. Such a predetermined time period is illustrated at Figure 5, in which the delays 70 ms, 50 ms, 80 ms and 60 ms terminate at the start of a (40 ms) virtual TTI. No new matter is added.

Independent Claims 46, 57, 68 and 79:

Claims 46, 57, 68 and 79 represent all pending independent claims, and each of these are rejected under 35 USC 102(e) in view of Sarkar.

The amendment set forth above distinguishes over Sarkar in that Sarkar does not disclose anything relevant to a predetermined period associated with the virtual transmission time interval has elapsed after which a next data packet may be transmitted. The rejection asserts at pages 2-3 and 15 that Sarkar transmits in two different modes: a first mode in response to a grant and at a granted transmission rate; and a second mode in which there is no grant and the mobile station transmits autonomously at an autonomous transmission rate. The rejection again asserts that there are TTIs inherently associated with each mode: an inherent grant TTI

corresponds to the claimed current air interface TTI and the inherent autonomous TTI corresponds to the claimed virtual TTI.

Assuming arguendo that all this is true, the rejection fails because there is no disclosure in Sarkar that there is any predetermined period, associated with the autonomous TTI that the Examiner asserts as inherent within Sarkar, after which a next data packet may be transmitted. This is true because Sarkar has no disclosure whatsoever about TTI. While it may be inherent that the granted transmission operate according to some TTI established in the network so that all mobile stations can be interfaced efficiently to scarce radio resources, one of ordinary skill in the art would view Sarkar as using that same TTI timing for autonomous transmissions for the same reason. There would be no separate grant TTI and autonomous TTI as the rejection asserts. The length of a TTI is not dependent on transmission rate, which is a fallacy the rejections appear to again rely upon.

Additionally, Sarkar explicitly teaches directly away from delaying an autonomous transmission, which would be the case if Sarkar were applied to claim 1 as the rejection recites. This is because Sarkar consistently asserts that the autonomous transmissions trade the burden of lower rate for the benefit of lower latency as compared to granted transmissions, which is a net benefit for low volumes of data. See for example (emphasis added to each):

¶0010 (if there's a busy signal due to loading on the individual and common grants, mobile stations can *reduce transmission rates in response* and transmit autonomously);

¶0073 ("*To avoid the delay introduced by the request/grant handshake*, ...an autonomous reverse link transmission is supported. A mobile station may transmit may transmit data *at a limited rate on the reverse link without making a request or waiting for a grant*.);

¶0077 ("As just described, a mobile station may *trade off throughput for latency* in deciding whether to use *autonomous transfer to transmit data with low latency* or requesting a higher rate transfer and waiting for a common or specific grant." and "So, a mobile station may select *autonomous transfer to reduce latency* associated with requests and grants,", and most particularly "Those of skill in the art will recognize that *as the amount of data to be transmitted grows*, requiring multiple packets for transmission, *the overall latency may be reduced by switching to a request and grant format, since the penalty of the request and grant will eventually be offset by the increased throughput of a higher data rate across multiple packets*."); and finally

¶0084 ("Autonomous Transmission: This case is used for traffic requiring *low delay*. The mobile station is allowed to *transmit immediately, up to a certain transmission rate*, determined by the serving base station…).

So even assuming arguendo all that the Examiner asserts in the rejection of the independent claims, Sarkar clearly and unequivocally teaches directly away from delaying for some period of time, predetermined or otherwise, a next transmission that is an autonomous transmission. To modify Sarkar to so delay an autonomous transmission is not obvious given ordinary skill, regardless of what some other reference might state, because such a modification would change Sarkar's principle of operation for the autonomous transmission to be a low latency option for when the network is congested (e.g., when the busy signal is asserted for the individual common grants). Because of this congestion Sarkar's autonomous transmission is necessarily rate-limited, but regardless of rate it is never delayed else its purpose is defeated. This is because the mobile station can simply instead undergo the request/grant process and get a higher rate transmission grant rather than delay for a lower-rate autonomous transmission. Without the lower latency, the autonomous transmission offers no benefit over the granted transmission and so ordinary skill cannot add to Sarkar a predetermined period of time after which an autonomous transmission is allowed.

For at least the above first reason, independent claims 46, 57, 68 and 79 patentably distinguish over Sarkar.

Additionally, the Applicants re-assert previously presented argument that Sarkar has nothing analogous to a virtual transmission time interval. As noted above, Sarkar's lack of specific teaching as to TTI would lead one of ordinary skill in the art to presume that whatever TTI controls in Sarkar's granted transmissions is continued in Sarkar's autonomous transmissions. To assume otherwise is to impose a timing issue in the various mobile station transmissions, which are received by a common base station, which adds complexity to Sarkar that is otherwise not present, and for no apparent purpose.

As was previously noted and as is well established in the wireless communication arts, TTI is unrelated to transmission rate. Where a data rate is low enough that the volume of data cannot physically fit into a specified TTI, the TTI is not adjusted (as the office action asserts) but instead the data to be transmitted is spread over two TTIs. Sarkar's various rates at

Figure 10 can all be used in a common and non-varying TTI arrangement, and often are. The opposite view expressed in the office action is that TTI varies inversely with data rate, which is not an obvious interpretation or modification given ordinary skill, and further which would add great complexity to a wireless communication system since the receiving base station would then have to interface to multiple mobile stations operating with different transmission start and stop times. If TTI were the inverse of data rate, the rates Sarkar gives by example would not line up in time, making the base station's reception highly difficult absent a dedicated receiver for each mobile station.

For at least the above second reason, independent claims 46, 57, 68 and 79 patentably distinguish over Sarkar.

No other reference of record is seen to bridge either of the above two distinctions over Sarkar, and so each independent claim is both novel and non-obvious over the cited art. All dependent claims are patentable at least for that dependency.

Dependent Claims 48, 59, 70 and 82:

Kim '653 is cited against dependent claims 48, 59, 70 and 82 which recite that the virtual TTI is an integer multiple of the air interface TTI. Kim '653 is directed to adjusting mobile station transmission rates to keep rise over thermal (ROT) within limits by comparing interference level within threshold values and signaling individual mobile stations with rate adjust information (col. 6 lines 42-64). The office action at page 10 asserts that reducing an initial air transmission rate (e.g., by half) corresponds to a new virtual TTI (e.g., twice as long). As stated above, TTI is not adjusted with data rate and to do so would impose multiple problems in network timing so one of ordinary skill in the art would not modify Sarkar in that manner, and so reference to Kim '653 is unavailing to bridge the TTI shortfall of Sarkar. While it is true that making the virtual TTI an integer multiple of the air interface TTI assures the start and stop times of the different TTIs align and so avoid timing problems at the receiving entity, it is also true that no reference teaches this aspect of the invention set forth in dependent claims 48, 59, 70 and 82. Therefore these claims are non-obvious over the cited art.

All claims are in condition for allowance, and the Applicants respectfully request the Examiner withdraw all outstanding rejections and to pass claims 46-82 to issue. The

undersigned representative welcomes the opportunity to resolve any matters that may remain, formal or otherwise, via teleconference at the Examiner's discretion.

Respectfully submitted:

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